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Reprinted from the Annals of Otology, Rhinology and Laryngology, March, 1909.

THE INDICATIONS FOR THE RADICAL MASTOID OPERATION, BASED UPON PATHOLOGIC LESIONS.*

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It would hardly seem to be necessary at this late day to discuss the indications for the radical mastoid operation before a body of otologists. An operation suggested upon rational, pathologic research, as early as 1873, should, by this time, have won its proper place in otology. After 36 years, it is expected that the object to be gained by this procedure, and the conditions which can properly be submitted to operation, should have been so definitely known, that they would not require of us to-day the time and thought necessary for their discussion.

However, the status of the operation is unsettled, and the reasons for this are not hard to find.

The operation gives apparently variable results even at the hands of the most experienced. Otologists, as a whole, have expected more from the procedure than scientific inquiry into its merits warrants. The indications for the employment of the radical operation have usually been based upon symptoms rather than upon an actual diagnosis of disease. Confusion naturally ensued, and the results obtained when employing the operation to cure a symptom caused us to overlook the results of the operation when computed on the basis of cures for a given disease.

A glance through the literature demonstrates that we have rather promiscuously submitted cases of otitis media purulenta chronica, with or without accompanying mastoiditis, to this operation, because after a fair and reasonable

*Read before the Eastern Section of the American Rhinological, Laryngological and Otological Society, Philadelphia, January 9, 1909.

time, with the best available therapeutics at command, we were unable to stop the persistent otorrhea, or we operated radically in these cases because acute exacerbations or intracranial or labyrinthine complications were threatening.

Excepting the symptoms in the complicating lesions, the prominent determining symptom—the otorrhea—is a common factor to many varying pathologic lesions within the middle ear and adjacent structures; and as such is not to be held as an indication for the radical mastoid operation.

A tentative classification of the pathologic lesions present in the middle ear and mastoid process, gives definite data from which so to limit the indications for the radical mastoid operation that more uniform results, under similar conditions, are obtainable.

Another element tending toward the uncertainty with which the radical mastoid operation is regarded, is to be found in the fact that we do not all perform the same operation for the same given pathologic lesions. We do not all perform a complete radical mastoid operation.

The Stacke operation is the selected procedure of many; the Zaufal operation—often designated in this country, the Schwartze-Stacke operation—has the majority of adherents, and, finally, a few—Heath, Bryant and Ballenger and their followers—have recently advocated a so-called modified radical operation, in which the ossicles are retained, and the membrana tympani preserved, in the interest of the hearing faculty.

Here again, confusion is averted, if the results obtained from these varying procedures are classified and judged separately.

The Stacke operation differs really but in slight degree from the Zaufal operation. It is rather a different route toward the same end. When we add to the Stacke method, complete evisceration of the mastoid contents, the end results of both operations are the same. A true Stacke operation limiting the surgery to the uncapping of the antrum after opening and connecting this with the tympanic cavity, and only removing the adjacent bone of the mastoid process, necessarily must only be indicated by a rather localized pathologic process.

When, however, the area of disease is extensive, i. e., if it is found spread beyond the confines of the tympanic

and the antral cavities, a removal of more tissue is indicated than the limits of the operative endeavor as laid down by Stacke.

Since no surgeon would stop his procedure before entirely eradicating all removable areas of disease, we hold the Stacke operation as now practiced to be a difference in technic rather than a separate operation from that of Zaufal (the Schwartze-Stacke), and we may consider the indications for both these operations together.

By the radical mastoid operation is meant a procedure which shall cleanse the tympanic cavity of all its diseased mucous membrane, in all its accessible and removable parts; which shall eradicate the cellular structure about the orifice of the Eustachian tube; which shall remove the two major ossicles and the remains of the membrana tympani; which shall open the mastoid antrum, connecting it with the tympanic cavity by as wide a passage as possible, thereby freeing the aditus ad antrum, eviscerating the diseased contents of these cavities, and finally removing as much of their respective bony walls as are found diseased and are capable of removal, and in addition removing from the mastoid process and temporal pyramid as much of its bony structure and its contents as is found diseased. To these procedures there is added a plastic. Such an operation meets the indications for radical mastoid surgery.

The operation devised by Heath, the one advocated by Bryant, and the so-called meato-mastoid operation of Ballenger, can hardly be held to constitute a radical mastoid operation at all. At another section of this Society, I shall discuss these operations in detail. Suffice it here to call attention to the fact that in the lesions of the middle ear and its adnexa, which are chronic in nature, and where there has existed a purulent, fetid otorrhea, coming through a more or less pronounced perforation or defect situated marginally in the drum, that with lesions producing these findings, there is usually bone necrosis in the neighboring parts—the aditus and the tympanic walls—especially the posterior tympanic wall. No operation devised to remove other parts, and yet preserve intact the original seat of the lesion is, surgically speaking, logical. Neither can the preservation of more or less diseased ossicles and the remains of a drum membrane whose final healing means the ad-

vent of considerable scar tissue give much toward the conservation of the hearing faculty. To find proof of this contention, we have only to call to mind the demonstrable loss of hearing in those cases of chronic otitis media purulenta, which we healed by local measures, where, after a lapse of time, the scar tissue became firmly contracted.

Either the entire principle under which otology has accepted ossiculectomy is an error, or what seems more likely from a study of the greater number of the cases submitted to this modified radical operation, Heath, Bryant and Ballenger, especially the two former—since Ballenger separates his indications for the meato-mastoid operation from those he lists for the radical—have thus operated upon cases which would have responded to a simple mastoidectomy, with results as brilliant regarding the hearing faculty, as these men report having obtained from the involved technic of the so-called modified radical operation. For the present, we can therefore leave out of account this operation in discussing the indications for radical mastoid surgery.

Otitis media purulenta chronica is a generic, clinical term. It implies a diseased ear with a persistent purulent discharge. Both from the standpoint of a consideration of the indications for the radical operation and for an estimation of the results of the procedure, so general a term as this can have no place in a list of conditions indicating a surgical procedure.

The actual pathologic lesions grouped under this term are: (See Chart, appended herewith.)

1. Caries of the ossicles accompanied or not by a suppurative inflammation of the mucous membrane lining the tympanic cavity and adnexa.

2. Chronic suppurative inflammation of the mucous membrane lining the tympanic and the adjacent cavities, including the Eustachian tube, especially at its orifice, without there being any disease present in the underlying bone at any point.

3. Caries of portions of the temporal pyramid (nontubercular and non-syphilitic in nature) accompanied by a suppurative inflammation of the mucous membrane lining the middle ear cavities.

4. Necrosis of greater or lesser portions of the bony walls of the middle ear spaces and mastoid process, with

destruction of large areas of mucous membrane lining the tympanic and adjacent cavities, and exudative inflammation in the remaining sections of the mucosa of the middle ear spaces.

5. The erosive lesions, pressure necroses in various parts of the middle ear, caused by the ingrowth of psuedo—and true cholesteatomata or other malignant growths; part of the clinical picture being caused by the disintegration of the cholesteatomatous or other new-growth masses, in addition to the pus caused by the bone necrosis.

6. The specific lesions of parts of the temporal bone, especially when found to involve the middle ear spaces and mastoid process: that is, the tubercular and syphilitic lesions.

It is not within the scope of this paper to take up the details of the differential diagnosis between these groups of cases.

These six groups of cases all present ears evidencing all or part of the following: A persistent discharge, usually fetid, coming through a perforation in the membrana tympani, of varying size and location, and often, in addition, presenting the presence of polyps or polypoid granulations on the visible portions of the mucous membrane, or inflammatory excrescences sprouting through the perforation.

The radical mastoid operation is not indicated in isolated caries of the two greater ossicles. This condition is rare, and on the whole, the removal of the diseased ossicles and the establishment of intratympanic drainage will suffice to cure these cases. When ossicular caries is accompanied by an exudative inflammation of the lining membrane of the tympanic cavity—a product of the irritation locally by the dead ossicles, plus insufficient drainage, or the result of disease in the nasopharynx which has spread by contiguity through the Eustachian tube, there also the radical mastoid operation is not immediately indicated. If after ossiculectomy and the proper treatment of the nasopharynx, large quantities of pus continue to emanate from the anterior wall of the tympanic cavity, or seem to come away from the upper chambers of the tympanic cavity, from the aditus especially, then radical mastoid surgery is indicated to remove detritus, lay open the disease-containing cavities, and render these accessible to subsequent after-treatment.

In cases where the mucous membrane lining the tympanic cavity and its adjacent structures is the seat of a chronic exudative inflammation, and there is no lesion present in the underlying bone, the pathologic process present in the mucous membrane is the product of the spread by contiguity of an exudative process in the nasopharynx and Eustachian tube. Removal of the primary foci and the performance of ossiculectomy may stop the exudative inflammation, and thus cause a cessation of the otorrhea. When the disease is of long standing and has thoroughly blocked the Eustachian tube by inflammatory exudate, and when the continuance of the process in the middle ear, by developing plastic inflammatory adhesions about the stapes and at the niches of the labyrinthine windows, threaten a gradual but progressive loss of hearing, then it would seem better in the interest of the patient's hearing and the prevention of a superimposition of an acute exacerbation, to clean out the middle ear spaces thoroughly, especially curetting the orifice of the Eustachian tube, and removing diseased mucous membrane, thus rendering the middle ear spaces in toto accessible to further local after-treatment.

In both the above groups of cases, which in a recent monograph,* I designated as of the nondangerous type of otitis media purulenta chronica, the disease may go on indefinitely without threatening intracranial involvement. This class of cases is, however, often subject to acute exacerbations, resulting in acute mastoiditis superimposed on the chronic disease of the mucous membrane of the middle ear. A simple mastoidectomy to relieve the acute symptoms will sometimes suffice in this particular class of cases, although I prefer the radical procedure for the reasons already given.

Radical operation is often demanded in the group of cases under discussion, because of the progressive loss of hearing which these cases evidence. The radical mastoid, by removing the major part of the diseased mucous membrane, eventually causes the suppuration to stop, because the instituted after-treatment permits a logical, rational therapeusis to be applied to the remains of the diseased tissue necessarily left in situ. The radical operation, even in its most extensive limits, is unable to effect a complete

*The Surgery of the Ear. Rebman Company, New York.

evisceration of the mucous membrane lining the middle ear spaces, and there generally remain portions of diseased tissue about the labyrinthine windows and in the more inaccessible parts of the Eustachian tube. Here then is a group of cases wherein the radical operation, although indicated as a step toward its cure, will not stop the otorrhea. The discharge from such ears only ceases when these remains of mucous membrane either become converted into epidermis, or become healed because their entire surroundings are healthy. Regarding the hearing in this group of cases, it is generally found slightly worse after the operation than before, provided the operative procedures have not been delayed too long in the course of the disease, but it is vastly better than it would be were the suppurative inflammation to be allowed to continue for years unchecked.

In necrosis of part or all of the bony tympanic walls, in caries located in the various parts of the temporal bone, mastoid process, sections of the petrosa, etc.; in pressure necrosis due to epithelial ingrowths from cholesteatoma, and in the syphilitic and the tubercular lesions of the mastoid process and petrosal pyramid, whether accompanied or not by a syphilitic or tubercular involvement of the tympanic cavity, the radical mastoid operation is indicated.

In ordinary bone necrosis, more or less localized in area, with or without sequestra formations, and in cases with cholesteatoma and tuberculosis of the mastoid process, the radical mastoid operation gives the most satisfactory results, although in cases with cholesteatoma, supervision is afterwards necessary to prevent recurrences. The predominating symptom—the otorrhea—is usually stopped as soon as the lesion is eradicated. In syphilitic lesions, I have often been unable to secure healing, because I could not secure proper epidermatization, although, generally speaking of these cases as a class, the results obtained warrant me in classing these lesions as indicating a radical mastoid operation.

When symptoms referable to intracranial involvement, or intralabyrinthine disease become evident, or when symptoms demonstrate an acute process superimposed upon any of the pathologic lesions constituting otitis media purulenta chronica, then the complete radical mastoid operation is immediately indicated.

Summarizing, we contend:

1. That the various diseases for which the radical mastoid operation is indicated should be classified and studied according to their pathologic aspect.

2. That the cessation of otorrhea is not the only condition for which the radical mastoid operation is indicated.

3. That the radical mastoid operation does not stop the otorrhea in a certain definite group of cases, but the operation is eventually indicated in these cases, notwithstanding failure to check this one symptom. In these cases, the operation is but one step toward their final cure.

4. That in bone lesions, located both in and beyond the tympanic cavity, the radical mastoid operation is the only procedure which is indicated by the pathologic lesions present in the mastoid process, temporal pyramid or tympanic walls. That the removal of the diseased bone cures the suppurating ear, and the result in these cases is proportionate to the thoroughness with which the lesion is eradicated.

5. Finally, that the so-called modified radical operation does not meet the indications for radical mastoid surgery.

Group.		Otoscopic Picture.	Lesion.	Complicating Lesions.	Operations Indicated.
Otitis Media Purulenta Chronica.	A.—Non-dangerous type.	Centrally located perforations.	Suppurative inflammation in Eustachian tube pharynx and mucous membrane of middle ear spaces.	Acute mastoiditis.	Surgery to nasopharynx, ossiculectomy and eventually radical mastoid operation. Occasionally, simple mastoidectomy suffices.
	B.—Dangerous type.	Perforations located at margin of membrana tympani.	Bone involved in middle ear, mastoid process or petrosal pyramid. Necrosis, caries, cholesteatoma, new growths, tuberculous or syphilitic processes in the bony structure.	Acute mastoiditis, intralabyrinthine or intracranial lesions, and any local intratympanic lesion causing facial palsy.	Radical mastoid operation as soon as diagnosis of bone lesion is made.